S.N.: 10/823,196
Art Unit: 2611

AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of the claims in this application.

Please cancel claims 40 and 59 without prejudice.

Listing of Claims:

1. (Currently Amended) A method, comprising:

receiving a wireless communication signal by a receiver from each of at least two spatially separated transmit antennas associated with at least one transmitter or from at least two transmitters; ~~and~~

performing on a corresponding complex composite base band received signal, comprised of real modulation signals, complex modulation signals or a combination of real and complex modulation signals, joint pre-filtering and reduced state sequence detection of real and imaginary parts of signals, from a single receive antenna branch or from a plurality of receive antenna branches, separately to filter out noise plus residual interference across inphase (I) and quadrature (Q) branches; and

determining whether operation of the receiver is in a first mode in which an interfering signal is determined to be directed to a different receiver or in a second mode in which the signals received from each of the at least two transmit antennas are to be processed as data.

2-12. Cancelled

13. (Previously Presented) A system according to claim 18, in which said base station transmits two transmission signals on the same channel.

14. (Previously Presented) A system according to claim 13, in which said two transmissions signals comprise two GMSK signals.

15. (Previously Presented) A system according to claim 13, in which said two transmissions signals comprise two 8PSK signals.

16. (Previously Presented) A system according to claim 13, in which said two transmissions signals comprise one 8PSK signal and one GMSK signal.

17. Cancelled

18. (Previously Presented) A wireless transmission system comprising:

at least one base station having at least two spatially separated antennas and at least one RF unit for transmitting one of a GMSK and an 8PSK transmission signal along each of said two spatially separated antennas;

at least one receiving station, having at least one antenna, for communicating with said base station;

where said receiving station comprises means for applying interference cancellation to a composite input signal comprising a combination of a first signal and a second signal interfering with said first signal, thereby reducing interference between said first signal and said second signal, in which said receiving station comprises means for evaluating the modulation type of an interfering signal and for estimating channel parameters of said interfering signal;

in which said channel parameters of said interfering signal are estimated by calculating channel parameters for all combinations of a desired signal and of said interfering signal and selecting the channel parameters that meet a criterion.

19. (Currently Amended) A wireless transmission system comprising:

at least one base station having at least one antenna and at least one RF unit for transmitting one of a GMSK and an 8PSK transmission signal;

at least one receiving station, having at least one antenna, for communicating with said

base station;

where said receiving station comprises means for applying interference cancellation to a composite input signal comprising a combination of a first signal and a second signal interfering with said first signal, thereby reducing interference between said first signal and said second signal, in which said receiving station comprises means for evaluating the modulation type of an interfering signal and for estimating channel parameters of said interfering signal; and

further comprising means for detecting whether said system is in a first transmission mode in which said interfering signal is to be discarded or is in a second transmission mode in which said first signal and said second signal are both to be processed as data; and

processing said second signal in accordance with said detected transmission mode.

20-24. Cancelled

25. (Previously Presented) The method of claim 1, where the real modulation signal is a GMSK signal, and where receiving includes rotating the received signals in complex space such that the GMSK signal is binary modulated.

26. (Previously Presented) The method of claim 1, where the base band received signal is a sum comprised of at least one GMSK signal, further comprising de-rotating the base band received signal with a factor $e^{-j\phi_k}$ such that the component GMSK signal is forced to be binary modulated.

27. (Previously Presented) The method of claim 26, further comprising splitting the I and Q parts of the de-rotated base band signal.

28. (Previously Presented) The method of claim 1, further comprising de-rotating and I-Q splitting the base band signal to yield modulation formats comprising binary, real and imaginary data streams.

29. (Previously Presented) The method of claim 1, where joint pre-filtering comprises using a set

of feed forward weights to minimize an error term that includes an I-Q MIMO feedback filter, wherein a feed forward filter separately filters real and imaginary parts of baseband data collected from at least one receive antennas.

30. (Previously Presented) The method of claim 29, where joint pre-filtering comprises optimizing filter coefficients according to a MMSE criterion.

31. (Previously Presented) The method of claim 1, where reduced state sequence detection comprises use of a reduced state soft output sequence estimation to jointly detect I-Q symbol streams that employs a branch metric comprised of I-Q components of the composite signal.

32. (Previously Presented) The method of claim 1, configured in an 8PSK blind I-Q interference suppression receiver when a GMSK interferer is present.

33. (Previously Presented) The method of claim 1, configured in a GMSK-8PSK or 8PSK-GMSK I-Q MIMO MMSE joint detection receiver.

34. (Previously Presented) The method of claim 1, configured in an 8PSK-8PSK I-Q MIMO MMSE receiver that jointly detects two 8PSK signals and rejects residual GMSK interference using I-Q whitening.

35. (Previously Presented) The method of claim 1, configured in a GMSK-GMSK I-Q MIMO MMSE receiver that jointly detects two GMSK signals and rejects residual GMSK plus 8PSK interference using I-Q whitening.

36. (Previously Presented) The method of claim 1, further comprising sequentially estimating desired and dominant interfering signal channel impulse responses, where channel estimation blindly identifies a dominant interferer modulation type and its training sequence.

37. (Previously Presented) The method of claim 36, where modulation identification comprises

use of $e^{j\pi k/2}$, $e^{j3\pi k/8}$ constellation rotations associated with GMSK and 8PSK modulations, respectively, and where training sequence identification comprises use of an estimation metric over a plurality of possible interference training sequence pairs.

38. (Previously Presented) The method of claim 36, where identifying the signal modulation type and training sequence comprises searching through known training sequences, and analyzing residual signals to identify a type of dominant interference.

39. (Previously Presented) The method of claim 1 further comprising, sequentially estimating interfering modulation type and training sequence, and performing a maximum likelihood joint channel estimate after all modulation types and training sequences are estimated.

40. (Canceled).

41. (Currently Amended) The method of claim 1 ~~-40~~, wherein ~~further comprising detecting whether operation is~~ in the ~~a~~ first mode, the ~~in which an~~ interfering signal is ~~to be~~ discarded ~~or in a second mode in which the signals received from each of the at least two transmit antennas are to be processed as data~~.

42. (Currently Amended) A device comprising:

a receiver configured to be coupled to at least one receive antenna to receive transmissions sent from at least two spatially separated transmit antennas, the transmissions comprising a real modulation transmission and a complex modulation transmission, said receiver further configured to operate on a complex baseband received signal comprised of the real modulation and complex modulation received signals to perform joint pre-filtering and reduced state sequence detection of real and imaginary parts of the signals separately to filter out noise plus residual interference across inphase (I) and quadrature (Q) branches, said receiver yet further configured to determine whether operation of the receiver is in a first mode in which an interfering signal is determined to be directed to a different receiver or in a second mode in which

<u>the signals received from each of the at least two transmit antennas are to be processed as data</u>.

43. (Previously Presented) The device of claim 42, where said receiver is coupled to a plurality of receive antennas.

44. (Previously Presented) The device of claim 42, where the real modulation signal is a GMSK signal, and where said receiver is further configured to rotate the received signals in complex space with a factor such that the GMSK signal is binary modulated.

45. (Previously Presented) The device of claim 42, where the base band received signal comprises at least one GMSK signal, and where said receiver is further configured to de-rotate the base band received signal with a factor $e^{-j\phi_k}$ such that component GMSK signal is forced to be binary modulated.

46. (Currently Amended) The device of claim <u>45</u> ~~25~~, where said receiver is further configured to split the I and Q parts of the re-rotated base band signal.

47. (Previously Presented) The device of claim 42, where said receiver is further configured to de-rotate and I-Q split the base band signal to yield modulation formats comprising binary, real and imaginary data streams.

48. (Previously Presented) The device of claim 42, where said receiver is further configured to jointly pre-filter by using a set of feed forward weights to minimize an error term that includes an I-Q MIMO feedback filter.

49. (Previously Presented) The device of claim 48, where said receiver is further configured to jointly pre-filter by optimizing filter coefficients according to a MMSE criterion.

50. (Previously Presented) The device of claim 42, where said receiver is further configured to perform reduced state sequence detection by use of a reduced state soft output sequence

estimation procedure to jointly detect I-Q symbol streams using a branch metric comprised of I-Q components of the composite signal.

51. (Previously Presented) The device of claim 42, where said receiver is configured as an 8PSK blind I-Q interference suppression receiver when a GMSK interferer is present.

52. (Previously Presented) The device of claim 42, where said receiver is configured as a GMSK-8PSK or 8PSK-GMSK I-Q MIMO MMSE joint detection receiver.

53. (Previously Presented) The device of claim 42, where said receiver is configured as an 8PSK-8PSK I-Q MIMO MMSE receiver operable to jointly detect two 8PSK signals and to reject residual GMSK interference using I-Q whitening.

54. (Previously Presented) The device of claim 42, where said receiver is configured as a GMSK-GMSK I-Q MIMO MMSE receiver operable to jointly detect two GMSK signals and to reject residual GMSK interference using I-Q whitening.

55. (Previously Presented) The device of claim 42, where said receiver is further configured to sequentially estimate desired and dominant interfering signal channel impulse responses, where channel estimation blindly identifies a dominant interferer modulation type and its training sequence.

56. (Previously Presented) The device of claim 55, where modulation identification comprises use of $e^{j\pi k/2}$, $e^{j3\pi k/8}$ constellation rotations associated with GMSK and 8PSK modulations, respectively, and where training sequence identification comprises use of an estimation metric over a plurality of possible interference training sequence pairs.

57. (Previously Presented) The device of claim 55, where said receiver is configured to identify the signal modulation type and training sequence using a search through known training sequences, and an analysis of residual signals to identify a type of dominant interference.

58. (Previously Presented) The device of claim 42, where said receiver is further configured to sequentially estimate interfering modulation type and training sequence, and to perform a maximum likelihood joint channel estimate after all modulation types and training sequences are estimated.

59. (Canceled).

60. (Currently Amended) The device of claim 42 ~~59~~, where ~~said receiver is further configured to detect whether operation is~~ in the ~~a~~ first mode, the ~~in which an~~ interfering signal is ~~to be~~ discarded ~~or in a second mode in which signals received from each of the at least two transmit antennas are to be processed as data~~.

61. (Previously Presented) A system according to claim 18, in which two transmission signals are transmitted by the same base station using two antennas or are transmitted by a plurality of base stations each using one antenna.

62. (New) A method, comprising:

receiving a wireless communication signal by a receiver from each of at least two spatially separated transmit antennas associated with at least one transmitter or from at least two transmitters;

performing on a corresponding complex composite base band received signal, comprised of real modulation signals, complex modulation signals or a combination of real and complex modulation signals, joint pre-filtering and reduced state sequence detection of real and imaginary parts of signals, from a single receive antenna branch or from a plurality of receive antenna branches, separately to filter out noise plus residual interference across inphase (I) and quadrature (Q) branches; and

sequentially estimating desired and dominant interfering signal channel impulse responses, where channel estimation blindly identifies a dominant interferer modulation type and its training sequence, where modulation identification comprises use of $e^{j\pi k/2}$, $e^{j3\pi k/8}$ constellation rotations associated with GMSK and 8PSK modulations, respectively, and where training sequence identification comprises use of an estimation metric over a plurality of possible interference training sequence pairs.

63. (New) A device comprising:

a receiver configured to be coupled to at least one receive antenna to receive transmissions sent from at least two spatially separated transmit antennas, the transmissions comprising a real modulation transmission and a complex modulation transmission, said receiver further configured to operate on a complex baseband received signal comprised of the real modulation and complex modulation received signals to perform joint pre-filtering and reduced state sequence detection of real and imaginary parts of the signals separately to filter out noise plus residual interference across inphase (I) and quadrature (Q) branches, said receiver yet further configured to sequentially estimate desired and dominant interfering signal channel impulse responses, where channel estimation blindly identifies a dominant interferer modulation type and its training sequence, where modulation identification comprises use of $e^{j\pi k/2}$, $e^{j3\pi k/8}$ constellation rotations associated with GMSK and 8PSK modulations, respectively, and where training sequence identification comprises use of an estimation metric over a plurality of possible interference training sequence pairs.